

CLAIMS

What is claimed is:

- 1 1. A composite ring for coupling a disk to a spindle, comprising:
2 a upper layer constructed of a material having a Young's modulus greater than or
3 equal to a primary material of the disk; and
4 a lower layer fixedly coupled to the upper layer and constructed of a material
5 having similar properties to that of the disk, the properties being selected
6 from a group consisting of a coefficient of thermal expansion, thermal
7 conductivity and Young's modulus.

- 1 2. A composite ring as recited in claim 1, wherein the upper layer has a Young's
2 modulus between about 20 to about 250 GPa .

- 1 3. A composite ring as recited in claim 1, wherein the upper layer has a Young's
2 modulus of between about 60 to about 300 GPa.

- 1 4. A composite ring as recited in claim 1, wherein the upper layer is constructed of a
2 material selected from a group consisting of chrome, titanium, nickel, stainless
3 steel and composites thereof.

- 1 5. A composite ring as recited in claim 1, wherein the lower layer has a thermal
2 expansion of between about 1 and 25 ($10^{-6}/^{\circ}\text{C}$) .
- 1 6. A composite ring as recited in claim 1, wherein the lower layer is constructed of a
2 material selected from a group consisting of aluminum and glass.
- 1 7. A composite ring as recited in claim 1, further comprising a middle layer fixedly
2 coupled between the upper and lower layers.
- 1 8. A composite ring as recited in claim 1, wherein the layers are coupled together via
2 mechanical bonding.
- 1 9. A composite ring as recited in claim 1, wherein the layers are coupled together by
2 an adhesive.
- 1 10. A composite ring as recited in claim 1, wherein the layers are coupled together at
2 a molecular level.
- 1 11. A composite ring as recited in claim 1, wherein a ratio of a modulus of the upper
2 layer to a modulus of the lower layer is between about 1 and 5.
- 1 12. A composite ring for coupling a disk to a spindle, comprising:

2 a upper layer constructed of a material having a Young's modulus greater than or
3 equal to a primary material of the disk; and
4 a lower layer fixedly coupled to the upper layer and constructed of a material
5 having similar properties to that of the disk, the properties being selected
6 from a group consisting of a coefficient of thermal expansion wherein the
7 upper layer has a hardness of greater than about 20 kg/mm²;
8 wherein the upper layer has a modulus of greater than about 60 GPa.

1 13. A composite ring as recited in claim 12, wherein the upper layer is constructed of
2 a material selected from a group consisting of chrome, titanium, nickel, stainless
3 steel and composites thereof.

1 14. A composite ring as recited in claim 12, wherein the lower layer has a thermal
2 expansion between about 1 and 25 (10⁻⁶/C) .

1 15. A composite ring as recited in claim 12, wherein the lower layer is constructed of
2 a material selected from a group consisting of aluminum and glass.

1 16. A composite ring as recited in claim 12, further comprising a middle layer fixedly
2 coupled between the upper and lower layers.

1 17. A composite ring as recited in claim 12, wherein the layers are coupled together
2 via mechanical bonding.

- 1 18. A composite ring as recited in claim 12, wherein the layers are coupled together
2 by an adhesive.
- 1 19. A composite ring as recited in claim 12, wherein the layers are coupled together at
2 a molecular level.
- 1 20. A composite ring as recited in claim 12, wherein a ratio of a modulus of the upper
2 layer to a modulus of the lower layer is between about 1 and 5.
- 1 21. A composite ring for coupling a disk to a spindle, comprising:
2 a upper layer; and
3 a lower layer fixedly coupled to the upper layer and constructed of a material
4 having similar properties to that of the disk, the properties being selected
5 from a group consisting of a coefficient of thermal expansion and thermal
6 conductivity;
7 wherein the upper layer has a Young's modulus greater than that of a primary
8 material of the disk;
9 wherein a ratio of the modulus of the upper layer to a modulus of the lower layer
10 is between about 1 and 5.
- 1 22. A composite ring as recited in claim 21, wherein the lower layer has a thermal
2 expansion between about 1 and 25 ($10^{-6}/^{\circ}\text{C}$) .

1 23. A composite ring as recited in claim 21, wherein the lower layer is constructed of
2 a material selected from a group consisting of aluminum and glass.

1 24. A composite ring as recited in claim 21, further comprising a middle layer fixedly
2 coupled between the upper and lower layers.

1 25. A magnetic storage system, comprising:
2 magnetic media coupled to a spindle using the composite ring of claim 1;
3 at least one head for reading from and writing to the magnetic media, each head
4 having:
5 a sensor;
6 a write element coupled to the sensor;
7 a slider for supporting the head; and
8 a control unit coupled to the head for controlling operation of the head.